

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended) A defect-inspecting apparatus comprising:

a stage on which an object to be inspected is mounted;

an illumination optical system comprising:

a high-angle illumination system which illuminates light on a surface of the object to be inspected with desired luminous flux from a high-angle relative to the surface of the object; and

a low-angle illumination system which illuminates light on the surface of the object to be inspected with desired luminous flux from a low-angle relative to said high-angle illumination system;

a detection optical system comprising:

an image formation optical system which condenses light scattered from the surface of the object by the illumination of the high-angle illumination system ~~and~~and/or said low-angle illumination system; and

~~a photoelectric conversion unit which receives the scattered light, of which image formation has been performed in the image formation optical system, to convert~~a detector which detects light from said image formation optical system and converts the scattered~~detected~~ light into a first luminance signal corresponding to

said light illuminated by said high-angle illumination optical system
and/or a second luminance signal corresponding to said light
illuminated by said low-angle illumination optical system; and
a comparison and judgment unit which classifies defects on the object to be
inspected into scratches, thin film-like foreign materials and convex defects by using
the first luminance signal and/or the second luminance signal, which have been
converted by the photoelectric conversion unit of the detection optical system.

Claim 2 (Previously Presented) A defect-inspecting apparatus according to
Claim 1, wherein:

the high-angle illumination system of the illumination optical system is
configured so that stray light is not generated from the image information optical
system.

Claim 3 (Previously Presented) A defect-inspecting apparatus according to
Claim 1, wherein:

the detection optical system comprises a shielding optical element which
shields a specific light image, which is caused by first reflection light generated from
a point high-angle incident-illuminated by the high-angle illumination system, on a
Fourier transformed surface of the first reflection light emitted from the point.

Claim 4 (Currently Amended) A defect-inspecting apparatus according to
Claim 1, wherein:

in the comparison and judgment unit, correlation between the first ~~luminance~~ signal and the second ~~luminance~~-signal is used to classify the defects into scratches, thin film-like foreign materials and convex defects.

Claim 5 (Currently Amended) A defect-inspecting apparatus according to Claim 1, wherein:

the comparison and judgment unit is configured to classify concave defects into scratches and thin film-like foreign materials on a basis of data in response to a defect size calculated by the first ~~luminance~~-signal and the second ~~luminance~~-signal.

Claim 6 (Currently Amended) A defect-inspecting apparatus according to Claim 1, wherein:

the comparison and judgment unit is configured to classify foreign materials, which are convex defects, into a small group and a large group on a basis of data in response to a defect size calculated by the first ~~luminance~~-signal and the second ~~luminance~~-signal.

Claim 7 (Previously Presented) A defect-inspecting apparatus according to Claim 1, wherein:

the comparison and judgment unit is configured to judge that a classified convex defect occurs inside a circuit pattern area, or that the classified convex defect occurs outside the circuit pattern area.

Claim 8 (Previously Presented) A defect-inspecting apparatus according to Claim 1, wherein:

the comparison and judgment unit has a displaying unit which displays information of defects classified by the comparison and judgment unit.

Claim 9 (Currently Amended) A defect-inspecting apparatus according to Claim 1, wherein:

the comparison and judgment unit has a displaying unit which displays information about a relation of the first ~~luminance~~-signal to classified defects.

Claim 10 (Currently Amended) A defect-inspecting apparatus according to Claim 1, wherein:

the comparison and judgment unit has a displaying unit for displaying information about a relation of the second ~~luminance~~-signal to discriminate a defect.

Claim 11 (Currently Amended) A defect-inspecting apparatus according to Claim 1, wherein:

the comparison and judgment unit has a displaying unit for plotting a relation between the first ~~luminance~~-signal and the second ~~luminance~~-signal, which have been converted by the ~~photoelectric conversion unit~~ detector of the detection optical system, on a correlation diagram, where a horizontal axis and a vertical axis are expressed by logarithm values, to display the relation.

Claim 12 (Previously Presented) A defect-inspecting apparatus according to Claim 1, wherein:

in the illumination optical system, a point incident-illuminated by the high-angle illumination system and a point oblique-illuminated by the low-angle illumination system, which are on the surface of the object to be inspected, are configured to be different from each other in a visual field of the detection optical system.

Claim 13 (Currently Amended) A defect-inspecting apparatus comprising:
a stage on which an object to be inspected is mounted;
an illumination optical system comprising;

~~an incident~~ a high-angle illumination system that incident-
~~illuminates~~ ~~illumination~~ illuminates with light including UV light or DUV
light at a point on a surface of the object to be inspected, which is
mounted on the stage, with desired luminous flux from a ~~normal~~
~~line~~ high angle direction relative to the surface ~~or from a direction in~~
~~proximity to the normal line~~; and

a ~~oblique~~ low-angle illumination system that ~~oblique-illuminates~~
~~illumination~~ illuminates light including UV light or DUV light, which has a
wavelength different from that of said ~~incident-illuminated~~ high-angle
illumination light, at a point on the surface of the object to be inspected
with desired luminous flux;

a detection optical system comprising;

a condensing optical system which condenses first ~~high-angle~~ scattered light traveling at a ~~high-angle~~ relative to the surface of the ~~object to be inspected~~, from among first reflection light generated from the point, which has been ~~incident-illuminated~~illuminated by the ~~incident~~high-angle illumination system of the illumination optical system, and second ~~high-angle~~ scattered light traveling at the ~~high-angle~~, from among second reflection light generated from the point, which has been ~~oblique-illuminated~~illuminated by the ~~oblique~~low-angle illumination system of the illumination optical system; and

~~a wavelength separation optical system which wavelength-~~
~~separates the first high-angle scattered light and the second high-angle~~
~~scattered light, which have been condensed by the condensing optical~~
~~system;~~

an image formation optical system which performs image formation of each of the first high-angle scattered light and the second high-angle scattered light, ~~which have been separated by the wavelength separation optical system;~~ and

a first and a second photoelectric conversion unit which receives each of the first high-angle scattered light and the second high-angle scattered light, for which image formation has been performed by the image formation optical system, to convert the first high-angle scattered light and the second high-angle scattered light into a first luminance signal and a second luminance signal respectively; and

a comparison and judgment unit which discriminates a defect on the object to be inspected on a basis of a relation between the first luminance signal converted by the first photoelectric conversion means and the second ~~luminance~~ luminance signal converted by the second photoelectric conversion means in the detection optical system.

Claim 14 (Currently Amended) A defect-inspecting apparatus according to Claim 13, wherein:

the incident illumination system of the illumination optical system is configured so that stray light is not generated from the high-angle ~~condensation~~ condensing optical system.

Claim 15 (Previously Presented) A defect-inspecting apparatus according to Claim 13, wherein:

the detection optical system comprises a shielding element which shields a specific light image, which is caused by the first reflection light, on a Fourier transformed surface of the first reflection light emitted from the point.

Claim 16 (Original) A defect-inspecting apparatus according to Claim 13, wherein:

in the comparison and judgment unit, ratios are used as the correlation.

Claim 17 (Currently Amended) A defect-inspecting apparatus according to Claim 13, wherein:

the comparison and judgment unit is configured to classify concave defects into scratches and thin film-like foreign materials on a basis of data in response to a defect size calculated by the first ~~luminance~~-signal and the second ~~luminance~~-signal.

Claim 18 (Currently Amended) A defect-inspecting apparatus according to Claim 13, wherein:

the comparison and judgment unit is configured to classify particulate foreign materials, which are convex defects, into a small group and a large group on a basis of data in response to a defect size calculated by the first ~~luminance~~-signal and the second ~~luminance~~-signal.

Claim 19 (Original) A defect-inspecting apparatus according to Claim 13, wherein:

the comparison and judgment unit is configured to judge that the classified convex defect occurs inside a circuit pattern area, or that the classified convex defect occurs outside the circuit pattern area.

Claim 20 (Original) A defect-inspecting apparatus according to Claim 13, wherein:

the comparison and judgment unit has an displaying means for displaying information of a discriminated defect.

Claim 21 (Currently Amended) A defect-inspecting apparatus according to Claim 13, wherein:

the comparison and judgment unit has a displaying means for displaying information about a relation of the first luminance-signal to discriminate a defect.

Claim 22 (Currently Amended) A defect-inspecting apparatus according to Claim 13, wherein:

the comparison and judgment unit has a displaying means for displaying information about a relation of the second luminance-signal to discriminate a defect.

Claim 23 (Currently Amended) A defect-inspecting apparatus according to Claim 13, wherein:

the comparison and judgment unit has a displaying means for plotting a relation between the first luminance-signal and the second luminance-signal, which have been converted by the photoelectric conversion means of the detection optical system, on a correlation diagram, where a horizontal axis and a vertical axis are expressed by logarithm values, to display the relation.

Claims 24 and 25 (Canceled)

Claim 26 (Currently Amended) A defect-inspecting method comprising:

high-angle illuminating light onto a surface of an object to be inspected with desired luminous flux from a high-angle relative to the surface of the object; and

low-angle illuminating light onto the surface of the object to be inspected with desired luminous flux from a low-angle relative to said high-angle illuminating;

detecting by:

condensing light scattered from the surface of the object by the illumination of the high-angle illuminating ~~and~~ and/or the low-angle illuminating; and

receiving the ~~scattered~~ detected light from the condensing, and converting the ~~scattered~~ detected light into a first luminance-signal corresponding to said light illuminated by said high-angle illuminating ~~and~~ and/or a second luminance-signal corresponding to said light illuminated by said low-angle illuminating; and

comparing and judging to classify defects on the object to be inspected into scratches, thin film-like foreign materials and convex defects by using the first ~~luminance-signal~~ and and/or the second ~~luminance-signal~~, which have been converted by the converting operation.

Claim 27 (Currently Amended) A defect-inspecting method comprising:
an illumination step for

~~incident-illuminating~~ high-angle illuminating illumination light including UV light or DUV light at a point on a surface of an object to be inspected, which is mounted on a stage, with desired luminous flux from a ~~normal-line~~ high-angle direction relative to the surface, ~~or from a direction in proximity to the normal line,~~ using an ~~incident-illuminating~~ high-angle-illuminating system; and

~~oblique-illuminating~~ low-angle illuminating illumination light including UV light or DUV light, which has a wavelength different from that of said ~~incident-illuminated~~ high-angle illumination light, at a point on the surface of the object to be inspected with desired luminous flux using a ~~oblique illumination~~ low-angle-illuminating system;

a detection step for

condensing first ~~high-angle-scattered light traveling at a high-angle relative to the surface of the object to be inspected, from among first reflection light generated from the point, which has been incident-illuminated~~ illuminated by the illumination high-angle illuminating step, and second high-angle-scattered light traveling at the ~~high-angle, from among second reflection light generated from the point, which has been oblique-illuminated~~ illuminated by the illumination low-angle-illuminating step, using a condensing optical system;

~~wavelength-separating the first high-angle scattered light and the second high-angle scattered light, which have been condensed, using a wavelength separation optical system;~~

performing image formation for each of the first high-angle scattered light and the second high-angle scattered light; and, ~~which have been wavelength-separated, using an image formation optical system; and~~

receiving each of the first high-angle scattered light and the second high-angle scattered light, for which image formation has been performed, using a first and a second photoelectric conversion means to convert the first high-angle scattered light and the second high-angle scattered light into a first ~~luminance-signal~~ and a second ~~luminance-signal~~ respectively; and

a comparison and judgment step for discriminating a defect on the object to be inspected on a basis of a correlation between the first ~~luminance-signal~~ converted by the detection step and the second ~~luminance-signal~~ converted by the second photoelectric conversion means.

Claim 28 (Canceled)

Claim 29 (Currently Amended) A method for producing a semiconductor

device comprising:

a fabrication process for polishing, washing, or sputtering an object surface of a semiconductor device;

a defect inspection process including:

high-angle illuminating light onto a surface of an object to be inspected with desired luminous flux from a high-angle relative to the surface of the object; and

low-angle illuminating light onto the surface of the object to be inspected with desired luminous flux from a low-angle relative to said high-angle illuminating;

detecting by:

condensing light scattered from the surface of the object by the illumination of the high-angle illuminating ~~and~~ and/or the low-angle illuminating; and

receiving the scattered ~~detected~~ light from the condensing, and converting the ~~scattered-detected~~ light into a first ~~luminance~~-signal corresponding to said light illuminated by said high-angle illuminating ~~and~~ and/or a second ~~luminance~~ signal corresponding to said light illuminated by said low-angle illuminating;

comparing and judging to classify defects on the object to be inspected into scratches, thin film-like foreign materials and convex defects by using the first ~~luminance-signal~~ and and/or the second ~~luminance-signal~~, which have been converted by the converting operation; and supplying the fabrication process with information of the scratches, thin film-like foreign materials and convex defects, which have been judged in the defect inspection process, as feedback.

Claim 30 (New) A defect-inspecting apparatus according to Claim 13, comprising:

a wavelength separation optical system which wavelength-separates the first high-angle scattered light and the second high-angle scattered light, which have been condensed by the condensing optical system.

Claim 31 (New) A defect-inspecting method according to Claim 27, comprising:

wavelength-separating the first high-angle scattered light and the second high-angle scattered light, which have been condensed, using a wavelength separation optical system.